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perhaps does all that is in his power, if he be duly careful to select for his crop of onions those soils and situations that are most likely to resist the various common incidents of season, peculiar to this very variable climate, and containing such eligible food, and in such proportions, as this bulbous esculent requires.

The maggot which attacks the carrot, I may remark, is certainly to be found in the soil, and visibly enters from without.

I conclude, for the present, with observing that worms and insects in general are driven from their retreats under ground by pouring bitter or acrid water upon it; such as water in which green walnuts have been steeped, or a ley made from potashes.

*On destroying the Caterpillars infesting Fruit Trees.* By Mr. Edward Sang, Nurseryman.

[From the Transactions of the Caledonian Horticultural Society.]

For the first seven years after the planting of my fruit trees on Loanyells garden-walls, they made a most promising progress. But after this period they became by degrees overrun with caterpillars, chiefly, I believe, of *phalana asperana*, which regularly made their appearance at the time of leafing.

The leaves were rolled up, and cemented with a glutinous substance; the caterpillar was lodged in the heart of the leaf, rolled up in a kind of imperfect cobweb, something like spider's work; and in this manner committed wonderful depredations.

Many of the buds never expanded, especially the fruit-buds, which having produced the foot-stalk of the young apple, the corolla never opened: it held the larva within it, which generally ate a hole down through the heart of the expected fruit, and so completed its destruction.

Year after year, even so late as the first or second week of June, many of my wall trees exhibited an appearance more like January than midsummer. After the depredations of the caterpillars were over, and when these had entered the chrysalis state, the trees made vigorous efforts to supply what had been destroyed, and generally produced a great profusion of breast-wood. The circumstance arose in some measure from the moths, as they came out, choosing in preference to deposit

their eggs in the flower-buds.

In spring, 1805, I had recourse to fresh water, which I threw upon the trees with as much violence as a hand force-pump was capable of; but from the worm being rolled up in the blossoms it was defended from moisture, which otherwise seems destructive to it, I did little or no good by this application.

In spring, 1806, I attempted their destruction by soot. After having wetted the trees, by means of a force-pump, I applied the soot with a bellows, containing it in a hopper attached to the pipe, with proper holes in the upper part. By this instrument I had the soot properly applied; and I flattered myself that I now had hit upon the means of destroying the caterpillar completely; but I found myself again disappointed.

After a great deal of trouble, and much expense, my trees still wore a sickly appearance, excepting that the breast-wood was always abundant. I now found my difficulties increased, my trees rendered unfruitful, and yet producing a profusion of fore-right shoots.

I had formerly experienced the good effects of cutting the roots of fruit-trees, which were too luxuriant in their growth, and had one of the trees laid open for this operation in the season 1807-8. The roots were large, but with few fibres: I found it necessary to shorten them, not only to stop the rambling growth complained of above, but to furnish the tree with proper feeders, in order to render it fruitful, in case of getting the better of the caterpillar. In this operation I observed, upon examination, that the soil was deficient of a proper quantity of animal substance. I consequently set about making up this deficiency.

In 1807 and 1808 fodder was very scarce, and many old horses killed. I availed myself of this circumstance, and collected all the dead horses I could procure in the neighbourhood, and I soon found myself master of above twenty carcasses. I had the trees on my East and South aspects, treated as follows: A circular trench was made, about three feet distant from the trunk, and so deep as to cut every root through: into this trench was put half a horse at least, divided into proper pieces, and covered up. The following spring, however, the caterpillars were not in the least diminished.

In spring, 1809, I resorted to tobacco-

liquor, and I found every worm which it could get at with the force-pump destroyed; but they are so well protected from any liquid, that but little was done in this way towards their destruction.\*

Owing to the severe treatment above described, and the depredations of the caterpillars, no fruit was produced: my trees, however, looked quite green and healthy.

In August and September I found the moths very numerous, flying about my trees; I was certain that they must deposit their eggs at this season, because at no other do they exist. Certain also of their being deposited upon or in the fruit and wood buds, I thought, if a proper liquor could be procured, sufficiently pungent and deleterious to kill them, and not to injure the trees, I might yet have a crop of fruit. Cheered with the hope of having a reward, for seventeen years application, I set about this last operation with alacrity.

In the beginning of January last, 1810, I took five pounds of flowers of sulphur, three pounds of soft soap, one pound of potash, four pints of very strong tobacco-liquor, (the expense of all which is but trifling,) and made up the mixture to ten pints, with fresh water: I put the mixture on the fire in a pot, and, when as intimately mixed as possible, I applied it in a luke-warm state, with a small painter's brush, so as not to miss a single bud; and potful after potful was mixed up, till I had washed thirty-four full grown wall trees, apple, pear, and cherry. Several trees, which had been dressed with horse flesh as above, were left unbrushed, that they might be compared with those which had been washed.

This application has at last proved successful: and now, on the first of June, I must say, that no money that I ever laid out yielded me so much pleasure, nor gave me such a prospect of profit. My trees, which had for many years exhibited an appearance of barrenness, are now full of most healthy well spread flowers, the stamina with fine antheræ upon them, quite bold;

\* The result of the experiments with the tobacco-liquor was communicated to Mr. Walter Nicol, in a letter dated the 29th November, 1809, which has been since published by him in his "Garden Directory, and Gardener's Calendar."

not a single apple-tree on the whole wall so washed being barren, and the cherries and pears set quite thick.

I have had visits from a number of professional men this Spring, who have expressed their admiration of the trees so treated. It is proper to add, that those which were left unwashed are nearly as usual, full of caterpillars, which I fear will resist my utmost efforts to reduce them at this season. I have applied tobacco-liquor in its strongest state: it has had a good effect, but still the power that they have to resist every liquid remains as an insuperable bar to their entire destruction, unless it be applied with a brush.

I use twenty-five pounds of sulphur, and a corresponding quantity of the other ingredients for thirty-four trees. The soap and tobacco-liquor gave a tenacity to the mixture so as to hold the particles of sulphur apart, while the potash penetrates deep into the buds and bark, and destroys the eggs which produce the worm, and consequently destroys the glutinous matter which prevents the leaves and flowers from expanding.

I attribute the present healthy appearance of my trees entirely to the above application. The cutting of the roots has thrown them into a profusion of flowers, while the wash has destroyed the destroyers of my fruit and trees. I am, therefore, fully satisfied of the excellence of this wash; and must say, that I never saw any thing applied to fruit trees nearly so effectual for destroying this-kind of caterpillars.

Another good effect of the wash may be stated. Six of the apple trees mentioned have been for the last eleven years much-injured by mildew; but at this time there is hardly an infected leaf to be seen.

*On the Culture of Onions, and particularly on the Advantages to be derived by transplanting them from Seed-bed into regular Rows, at a proper Distance from each other. By Mr. James Macdonald, Gardener to his Grace the Duke of Buccleuch and Queensberry, Dalkeith.*

(From the Transactions of the Caledonian Horticultural Society.)

The onion, a well-known root, is in this country in common use among per-